

ABSTRACT OF DISCLOSURE

An organic semiconductor device in which recombination of holes and electrons and photoelectric conversion in an organic semiconductor layer are efficiently allowed to occur. The device comprises a bipolar organic semiconductor layer where electrons and holes move, a hole giving/receiving electrode which gives/receives holes to/from the organic semiconductor layer, an electron giving/receiving electrode which is spaced a predetermined distance from the hole giving/receiving electrode and gives/receives electrons to/from the organic semiconductor layer, a hole-side gate electrode which is opposed to a region of the organic semiconductor layer near the hole giving/receiving electrode with an insulating layer between the hole-side gate electrode and the region and serves to control the hole distribution in the organic semiconductor layer, and an electron-side gate electrode which is opposed to the region of the organic semiconductor layer with the insulating layer therebetween and serves to control the electron distribution in the organic semiconductor layer.